Science Technology and Energy Policy Programs

Annual Report, F.Y. 1982/83

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The following report was presented to Social Sciences Division during its annual staff meeting on May 18, 1983. The purpose of the report is to evaluate the work of the Unit in the context of the Centre's objectives and activities.

The report was principally written by the Associate Director in consultation with other program colleagues. The section on training was written by Chris Smart and Energy Policy by Hartmut Krugmann. The Associate Director is responsible for the contents and the points of view expressed in the following pages.

Sections I-V deal with Science and Technology Policy support and section VI with Energy Policy; they are discussed separately in order to clarify the evolution of the two program perspectives. The two perspectives are administratively and operationally integrated and program officers work in all aspects of the Science, Technology and Energy Policy (STEP) program.

SCIENCE AND TECHNOLOGY POLICY PROGRAM
ANNUAL REPORT, 1982/83

I. Introduction

Science and technology policy is an attempt, normally by a government, to assess, monitor and direct science and technology activities in a given country. Three factors make this a difficult, if not an impossible, undertaking; first, the enormous scope and depth of science and technology which continues to expand exponentially in a huge literature explosion covering many fields and sub fields; second, science and to a lesser extent, technology, is international in its generation and application so that no one country is independent of the actions of other scientists and engineers living in other countries; third, governments make their decisions - which may or may not be part of a policy - in terms of objective needs and political constraints and which may or may not include science and technology as a factor.

If these three constraints limit the capacity to make science and technology policy then is there a need for research and policy work in this area? The best argument for such knowledge lies in history and practice. During the last two hundred years increasing world wealth and welfare has been associated with the application of science and technology to traditional practices, at once improving and changing them; there are many examples including the application of biological knowledge to plant breeding and so to crops; the introduction of new machinery into old industries such as textiles; and the creation of new industries - through biotechnology or micro-electronics - all of which are international in their scope and application. These processes occur - often with the support of governments - and influence the actions of other governments and nations because they represent a best practice or improved performance against which an exporting nation has to compete. Therefore, a government has to try to obtain information about current and future technologies in order to review investment, manpower and other decisions which will influence a nation's future capacity.

Few countries are capable of such activities and it could be argued that given the inherent risk and uncertainty of science and technology the intent to map the future implications of science and technology are not worthwhile. Although some governments have taken this view, it is not widely shared because there are costs and benefits which have to be taken into account; it is possible that there is a cost of not taking any action. Although it is difficult to describe the role of science and technology in many developing countries, there is a prima facie case that increased food production, better education and improved welfare can and have resulted from increasing the commitment of a government to science and technology for development.

The first objective of this program is to help countries establish or review their knowledge and understanding of the effects of science and technology on their societies. Self-knowledge about resources and their use is a necessary first step to understanding the value and future role of science and technology. To go further than a preliminary mapping requires a scientific community, a knowledge of local productions and processes, their technology and a commitment to pure and applied research. The majority of developing countries need to attempt this task while only a minority can proceed to look at science and technology and its applications; even fewer have made the long term commitment to place science and technology at the forefront of their development plans.

The program, in the past, emphasised 'policy' as much as it did 'science and technology'. During the last two years this approach has been altered because of the inherent complications and restricted influence of such studies. Policy continues to play a role in promoting science and technology, but the real resource for such activities are the scientists and technologists themselves who must make such an approach work. Therefore, during this year the program has spent more time discussing particular aspects of the costs and benefits of science and technology in particular circumstances rather than promoting the value of global policy approaches.

The program has found that there is a great interest in pragmatic studies - those that explain a particular problem with a greater range of explanations than those provided by policy variables alone - as a way of showing how given national problems can be overcome or better understood by involving scientific and technological information. The overall effect of these studies is not large but they do allow nationals who might otherwise remain silent to propose alternatives at a time when outside - particularly financial - advice is discouraging social and economic innovation.

If there is a pattern in the projects passed during the current year, then it hopefully lies in the way in which the program tries to meet the needs of recipients. If there is a real problem which can be illuminated by research of this kind - which is not true of all problems - and if the researchers are open to all sides of the question, then the program will review their proposals sympathetically. Although the program is within the Social Sciences Division there is no possibility or wish to promote a given discipline; rather the program deals with a subject area to which all disciplines can contribute because they are issues which involve national values and objectives - possibly involving the expenditure of public funds about which all citizens have the right and duty to make their opinions known. As a subject which involves complicated knowledge, the number of people who are involved in such activities are restricted. But it would be a serious social and intellectual mistake to increase these natural restrictions by limiting such work to a given discipline of social science. Science and technology influences and possibly controls the pattern of social and economic development in a country; the greater the exploration of this field, the greater the information that a country or group has in order to make careful choices. Such choices are vital to proper development and it is our hope that the money expended by the Centre within this area allows for better and more rational knowledge about the costs and benefits of science and technology.

II. Projects

In FY 1982/83 the STEP was allocated $1.8mn and expended 1.825mn. A portion of this expenditure was used in support of current projects.

(a) Supplements

The following projects were supplemented during FY 1982/83:

78-0025	Caribbean Technology Policy (Ph.II)	$124,000
79-0146	Technology Policy Workshop	95,000
80-0098	National Development Banks (Ph. I)	23,800
80-0139	Peasant Technology Survey (Paraguay)	50,000
80-0104	Science Community (Peru)	22,100
81-0136	Technology and Employment (Chile)	16,200
81-0137	Technical Change Dairy Sector (Urug.)	16,000
	Total	$347,100

The supplementary support amounted to $347.1 thousand dollars or 19 percent of the total appropriations during the year.

There were three fundamental reasons for providing both greater time and support for these projects.

(i) unforseen increase in basic costs: Particularly airtickets (TPW) and meetings (CTPS), (NDB).

(ii) increase in time to sustain basic activity: Particularly survey application and analysis (Peasant Technology Survey, Science Community, Technology and Employment, Dairy Sector) all of which required an additional period of time and funds.

T. 1 Project Distribution by Theme and Area, 1982/83

	Africa	Asia	Middle East	Latin America	Total
Resource Allocation				1 (37.7)	1 (37.7)
Agricultural Research and Technical Change	2 (135.5)			5 (613.3)	7 (748.8)
Small Scale Industry	1 (27.3)				1 (27.3)
Technical Change and Manufacturing	2 (88.3)	3 (189.0)		1 (69.0)	6 (346.3)
Technology, Employment, Education and Development					
Communication/Information				1 (50.0)	1 (50.0)
Other*	1 (268.0)				1 (268.0)
Total	6 (519.1)	3 (189.0)		8 (770.0)	17 (1478.1)

* Multiple categories

(iii) required additional costs: In order to make more efficient the basic purpose of the research; particularly the addition of a meeting in the NDB project and the partial purchase of a vehicle in the Paraguay survey.

There are some general lessons to be drawn from these supplementary expenditures:

First, the unit's commitment to an existing commitment can result in funding limitations for newer initiatives. In our view it is better to have existing work completed well rather than new work commenced in that year. Second, costs increase in network projects because of the need to meet and maintain links between researchers; CTPS, TPW and NDB have all had more meetings than first budgeted and meetings involve travel and are so linked to increasing travel costs. Third, four of the supplements involve Latin American institutions and illustrate the difficulties encountered by recipients and the Centre in establishing valid estimates because of inflation and exchange rate fluctuations; because of the nature of these institutions they are unable to absorb additional costs.

In general, in any given year a percentage of the total appropriations must be put aside for supplments so reducing the new initiatives budget by 15-20 percent.

(b) Project Theme

The annual and four year program of work and budget sets out a series of themes identified by the STPU as areas of interest and competence. The projects funded in 1982/83 are set out in the accompanying table and commented on below.

(i) Resource Allocation: The unit supported one project in this category which deals with the infrastructure for the space sciences found in Mexico. The study will be undertaken by practising scientists and will end with a meeting which reviews the findings with participants from India, Brazil and France.

(ii) Agricultural Research and Technical Change: The unit supported work in Latin America and Africa under this category and the studies can be distinguished as to their general or specific application. A general application should lead to an understanding of a process which can be fruitfully compared to similar processes in other countries; while a specific application should lead to an explicit improvement in knowledge of a subsector with possible, but secondary spin-offs, to other studies.

Latin America: The general studies include a review of the material on agro-industries to be found in Costa Rica and Central America; and the exploration of methods to evaluate appropriate technology initiatives (Chile).

The specific studies include a continuation of the examination of Technical Change in the Dairy Sector (Uruguay) and a short policy relevant study on Pampa Agriculture (Argentina).

Finally, there is a project which deals with process only, the linking of a number of small institutions together in a network entitled Social Aspects of Rural Technology.

Africa: one general study on Food Technology Policy (Nigeria) building on previous work by the recipients on food policy in general; and a specific study on the diffusion of Biological Nitrogen Fixation in Kenya.

(iii) Small Scale Technology: The unit has supported one exploratory study on informal sector technology (Ghana) under this category.

(iv) Technical Change and the Manufacturing Sector: This rubric covers a wide variety of issues and can again be divided into general and specific.

In the general category, the unit has supported work on criteria for foreign investment in Ghana; the applications of standards in the development of world technology (Korea) and an analysis of the manpower needs and requirements for science and technology (Thailand).

More specifically the unit has supported a study of the copper sector (Peru) and its capacity to develop downstream capacity in the future; a review of oil refining agreements (Sierra Leone) and the role of technical change in the textile sector (Bangladesh).

(v) Technology, Employment, Education and Development: No projects.

(vi) Communications and Information: A short study comparing the infrastructure of Brazil and Mexico in order to evaluate the capacity of the respective nations to support computer conferencing.

(vii) Other: A network project, which covers a number of the above fields, known as the East African Technology Policy Studies network.

In summary, the unit supported 17 new projects. Besides the 7 supplements mentioned earlier, the most important feature of the year was the increase in the number of projects with African institutions.

(c) Project Type

All projects are research projects but some have a further objective which includes the building of networks, dissemination and training.

Networks: the unit has supported two network projects, first, the East Africa Technology Policy Studies network which is run from the Kenya office; and second, Social Aspects of Rural Technology which links a number of small institutions in Latin America.

Two projects contribute to networks; the Technology Assessment Project being undertaken by GIA (Chile) and which will feed into the Social Aspects of Rural Technology network; and a short study on agro-industries in Costa Rica and Central America which is a national continuation of the Technology Policy (Central America) and continues to be linked to the regional co-ordination office.

Only one project, Pampa Agriculture, has emphasised dissemination in that it attempts to explain the results of the PROTAAL projects for future Argentinian policy makers.

Finally there are three projects which can be considered as much training as research projects: foreign investment criteria (Ghana); the informal sector (Sierra Leone) and oil contracts (Ghana). The function of training will be considered in more detail below.

(d) Type of Recipient

If recipients are divided into regional organizations, universities and associated institutions, government agencies and research institutions, then the following were funded in FY 1982/83:

(i) regional institutions: One study, on computer conferencing infrastructure, was funded with the Centro Regional para America Latina y el Caribe of the Intergovernmental Bureau for Informatics (IBI).

(ii) universities: Seven university institutions were supported in 1982/83 of which one was in Korea; another in Mexico and the remainder in Africa. The close relationship between universities and research in this field in Africa indicates the key role that universities play - with little or no competition - in undertaking research.

(iii) government agencies: Four government agencies in Ghana, Costa Rica, Thailand and Bangladesh received support from the program.

(iv) independent research centres: All the private independent research centres were in Latin America and included countries from the Southern Cone (Argentina, Chile, Uruguay) as well as institutions in Peru and Colombia.

The majority of teams undertaking research consisted of a number of disciplines, including scientists and social scientists. In the one case where social scientists alone are involved (eg. Copper Policy in Peru) there is a commitment to review the technical literature.

(e) Time Structure

Time (months)	Projects
Less than 6	2
7-12	6
13-18	5
19-24	3
25-36	1
Total	17

A number of the projects are exploratory and therefore will end within one year. This type of project, which is necessary in this field, increases the administrative load for the coming year.

III. Divisional Activity Projects

Divisional Activity Projects or DAP's were used in two principal ways in 1982/83; to support other activities through travel or third party meetings and to assist in the development of projects which are likely to come to fruition in future years:

(a) Support

The DAP budget supported travel for one person to attend a course in Australia from India; and another to an important regional meeting in India. If the SGBA grants are also included and used for the same purpose, then the total resources for support amounted to $29,680. The cancellation of the SGBA fund will severely constrain such travel support in the future.

(b) Project Development

Four projects or activities are likely to result from DAP expenditures in the coming year; the bulk of STPU resources went to the Technology, Employment, Education and Development network (TEED), with three other interesting consultancies supported with specified activities.

Technology, Employment and Education in Development: support for this potential network consisted of meeting support and consultancies. The unit supported two meetings in FY 1982/83 with the Education unit; the initial meeting in Edinborough (May 1982) and the Kenya project exploration meeting (January 1983). The Unit will fully support the TEED meeting which is now to take place in Santiago between September 5-9, 1983.

The complexity and importance of the theme also led to a number of consultancies in order to provide information for researchers and policy makers. The consultancies included a bibliographical review of recent work in Latin America (E. Luna); a review of

current government, provincial and other policy work in Canada in order to assess both the impact and methods used (V. Berry); a review of case studies and case study methodology (L. Acero); and an examination of the impact in Sweden and Germany of advanced machine tools on the labour force (S. Jacobssen).

The total resources expended amounted to $76,705.

A number of other consultancies in this area supported by the STEP include those for Ravi Chopra (India) and E. Kisanga (3-A-82-4149). The unit has also initiated discussions with DAP money for a possible Canada-Kenya project on work cognition and education.

Small scale technology: Mirko Lauer, a Peruvian with considerable experience of artisan goods and their marketing, is reviewing current government policy on the development of this sector in a series of Latin American countries. Artisan products lie between small rural industry and the informal sector in most Latin American economies and have, in recent years, been generating more and more income as traded goods. His task is to look at the consequences of this policy with the possibility of reviewing the findings at a meeting during this fiscal year.

Communications: Support for travel to Buenos Aires for Hector Schmuckler in order to develop a project on communications and technology.

Science and Technology Policy Meeting: During the last year there has been general agreement that it is necessary to re-examine and review - with policy makers and researchers - the science and technology policy of a number of key developing countries. The first country likely to be reviewed under this policy is Korea. However, Giri Deshinkar, of the Centre for the Study of Developing Societies, is currently preparing two documents in order to prepare for a meeting on Chinese Science and Technology Policy in 1984/85.

In the coming year we will receive $125,000 which means that the DAP budget for the Unit remains static. This is particularly unfortunate as the program has no access to regional office DAP funds - which depend on the pressure of the regional program officers; and objectively, because of the varied nature of the field, STEP requires more explorations and state of the art surveys than discipline areas.

IV. Project Completion and Dissemination

The project cycle is only complete when the report has been received and disseminated; a publication has been supported externally and a Project Completion report issued internally. The program is extremely weak in the dissemination, diffusion and evaluation of project material.

(a) Project Completion

Nine final project documents were recieved during FY 1982/83. These included Modern and Traditional Technology (Ethiopia); Namosi Copper Mine evaluation (Fiji); State Purchasing Power (Argentina); Impact of Technology on Traditional Skills (Brazil); Consulting and Engineering Companies (Peru); and Technology and Small Medium-Sized Industry (Colombia); Traditional Knowledge and Farm Technology (Peru). In my opinion, none of these have been evaluated properly.

(b) Publications

One major publication was issued last year. It is an account of the Absorption and Diffusion of Imported Technology final meeting which took place in January 1981. A number of STPI publications continue to be issued to remind us of the good old days, together with papers from the PROTAAL and BID-CEPAL networks which are partially supported but not issued directly by the Centre. The six books from the Caribbean Technology Policy Studies (Phase I) which were expected to be published in 1980 continue to be delayed because of unfortunate publishing problems.

(c) Project Completion Reports

As OPE has indicated, the unit continues to have a backlog of Project Completion Reports which may well increase when we examine the projects which are likely to be completed in FY 1983/84 (see below).

(d) Publishable Reports

A number of reports from long completed projects continue to have validity and should be reviewed. Two, for example, which could make a contribution to the literature are that on the Uruguayan Printing Industry (1979) and Risk and Technology Adoption (1981).

(e) Projects Due for Completion During FY 1983/84

The following projects are likely to be completed during the current FY. These are:

No.	Title	Program Estimated Date
74-0130	Technology Policy (C. America)	Aug. 1983
78-0025	Caribbean Technology Policy	Dec. 1983
78-0077-02	Metalworking in L. America (Peru)	Dec. 1983
79-0131	Small + Medium Sized Ind.(Brazil)	July 1983
79-0146	Technology Policy Workshop	Dec. 1983
80-0067	Rural Education (FUNDAEC)	
80-0096	Science + Technology Policy in Mexican Public Health (Mexico)	December
80-0200	Technical Capacity in the Textile Sector (Bangladesh)	
81-0013	Multinational Corporations in Latin America	
80-0139	Peasant Technology (Paraguay)	Dec. 1983
81-0029	Technology Use in Andean Communities (Ecuador)	
81-0047	Employment Policy and Technical Change (Colombia)	June 1983
81-0049	Agrarian Reform and Technical Change (Peru)	Sept.1983
81-0104	Role of Science Community (Peru)	Aug. 1983
81-0136	Technology and Employment (Chile)	July 1983
81-0221	Technology + Female Employment (Uruguay)	July 1983
81-0234	Technology Transfer and the Balance of Payments (Mexico)	Aug. 1983

To this must be added the following projects supported in 1982/83 which will be completed this year:

82-0007	Computer Conferencing Infrastructure (Mexico)
82-0120	BNF (Kenya)
82-0197	Rural Technology Assessment (Chile)
82-0204	Pampa Agriculture (Argentina)

Also two short projects which fall within the TEED network have been funded in this current fiscal year.

The number of projects (22) ending in FY 1983/84, coupled with considerable backlog will require program staff to place greater emphasis on project reviews and evaluation and to spend more time writing project completion reports. This is the least of the burden as it is more important to ensure the effective dissemination of these studies. Such activities require co-ordination between Centre Divisions, recipients and the target public which is neither automatic nor simple to ensure. The total number of projects ending this year indicates that the program is going through a shift and that the period of consolidation - announced when Geoff Oldham retired from the program - is now probably at an end.

(f) Problem Projects

Four projects, in particular, have caused the program staff some concern because they have not effectively commenced; three are from previous years, National Develoment Banks (Phase II) and National Agricultural Research Systems and the co-ordination portion of Metalworking in Latin America (CEPAL). Recently, we have learned that ISNAR is willing to sponsor the National Agricultural Research System project in place of IICE so that the research work is likely to commence soon. Food Technology Policy (Nigeria) was delayed for a period of nine months because of the failure to sign the MGC, in part because of student unrest at the University.

V. Training

The research projects normally supported by the Centre may provide training opportunities which will be explicit in that training is one of the objectives of the project, the individual to be trained can be identified and/or a formal training activity can be specified. However, training may be implicit in that the research process will provide opportunities to those associated with the project, usually younger less experienced research assistants, to improve their research skills or to gain access to a new field of enquiry. Of 17 new projects approved in 1982/83, 13 had a training component of some form.

Listed below are current projects which incorporate either explicit or implicit training activities.

79-0146 Technology Policy Workshop

Explicit: 80 researchers and policy makers participate in Technology Policy Workshops dealing with both research and policy formulation related to technology acquisition in developing countries.

82-0003 Choice of Technique in Spinning (Bangladesh)

Explicit: The researcher, in undertaking an important study on technological choice in spinning for the Bangladesh Textile Mills Corporation, is refining data and research techniques towards completion of his doctorate.

82-0004 Food Technology Policy (Nigeria)

Explicit: Two graduate students identified as capable of post graduate study will assist with the project. Under the guidance of the principal researcher they will be instructed in the techniques of

in-depth interviewing. One of the students will be encouraged to use the research findings as the basis of his doctorate.

82-0009 Social Aspects of Rural Technology (Latin America)

Implicit: Although all of the researchers involved in this network project have considerable research experience they will all benefit (a) from involvement in a larger network project more complex than anything they have previously done; (b) through association with more experienced researchers in FUNDAEC (especially Dr. Farzam Arbab who co-ordinates the project) and (c) through participation in workshops and seminars which will introduce the researchers to alternative methodologies and provide constructive criticism of their own research.

82-0032 Technology Policy Studies (East Africa)

Explicit: An objective of this project is to develop essential research skills and to support a group of younger (less experienced) researchers usually undertaking independent research in technology policy for the first time.

Some of the participants of the Technology Policy Workshop (79-0146) mentioned above will use funds provided in this project to support their research. Workshops and seminars associated with this project also provide opportunities for learning through critical assessment of work in progress and through discussion of alternative approaches to research.

Several of the researchers will use their work as the basis of higher degrees.

82-0099 Methodologies for Energy Planning

Implicit: The project provides training for four graduate students in energy research methods

and issues such as resource assessment, energy demand management, biomas utilization for energy, and policy formulation for energy sector development.

82-0120 Disseminatioin of Biological Nitrogen Fixation Technology (Kenya)

Implicit: The principal researcher, a microbiologist, will for the first time work as a member of an interdisciplinary team which includes a sociologist and an agricultural economist. All are concerned with the social dimension of introducing technical innovations to traditional farmers. For the social scientists, this is their first unsupervised and independent research effort since completing their Ph.D. degrees.

82-0157 Technological Capability in Oil Refining (Sierra Leone)

Implicit: The principal researcher is an Atomic Physicist, who has for some time wanted to change his research interests to contribute to the development of Sierra Leone. His participation in the Technology Policy Workshop for West Africa (79-0146) enabled him to develop this research proposal. As this is a first effort in technology policy research there is a strong training element for the principal researcher.

82-0197 Rural Technology Assessment (Chile)

Implicit: Four graduates with GIA (Grupo de Investigaciones Agrarias) will use the project to complete an initial period of training provided by the Inter-American Foundation. The project will permit the students to be active participants in the project while under the expert supervision of the project co-ordinator.

82-0202 Technical Capacity and Nationalisation (Ghana)

Implicit: The principal researcher was a participant in the Technology Policy Workshop for West Africa (79-0146). This project will be his first

research in technology policy since completing his Ph.D. Implicit training activities will involve visits to senior researchers in North America and Europe and participation in a workshop to be held in connection with this project. Two younger research assistants will also work on technology policy research for the first time.

82-0212 Agro Industry: Technology Policy (Costa Rica)

Implicit: The research team will use this project to explore the possibility of a larger project on the issues tentatively explored in this project. The group was formerly part of a network project (74-0130) but will begin independent work with this project. A consultant attached to the project and visits by the senior researcher to centres in Mexico and the US will provide opportunities for evaluation and criticism of the work done under this project.

82-0224 Technical Change in the Dairy Sector (Uruguay)

Implicit: Three graduate students will work on this project receiving training in empirical research methods and in the analysis of one of the case studies.

82-0236 Informal Sector Technological Capability (Sierra Leone)

Implicit: The principal researcher is a historian who has used the techniques of oral history to investigate traditional technology in rural Sierra Leone. As a result of his participation in the Technology Policy Workshop for West Africa (79-0146) he has proposed this project which will enable him to apply his skills as a historian to a study of technology-related issues directly related to technology policy. Up to fifteen younger research assistants will be trained in the techniques of in-depth interviewing in the course of the project.

82-0237 Review of National Standards System (South Korea)

Implicit: The principal resercher, a mechanical engineer, will be working for the first time in a multidisciplinary team concerned with policy-related research using social science methods.

Other Training Activities

The Science and Technology Policy Programme has requested a post project award for Mr. John Micah, the researcher on the Analysis of Local Technological Capabilities in Agro Processing Technology (Ghana) (80-0015). The award will enable Mr. Micah to complete his Ph.D. at the University of Cape Coast.

T.2. Science and Technology Policy Programme Summary Training 1982/83

Project No.	Title	Number and Level of Trainees		Notes
		Explicit	Implicit	
79-0146	Technology Policy Workshop (Ph. 1)	40 pg	-	A training project
82-0003	Choice of Technique of Spinning and Weaving (Bangladesh)	1 Ph.D. fieldwork	-	
82-0004	Food Technology Policy (Nigeria)	2 pg (one possible Ph.D)	-	
82-0007	Computer Conferencing Infrastructure (Latin America)	-	-	
82-0009	Social Aspects of Rural Technology (Latin America)	-	5 Post Ph.D and pg with holder 6 in component projects	
82-0032	Technology Policy Studies (E. Africa)	10 or more pg and post Ph.D. depending on the size of research teams	-	
82-0099	Methodologies for Energy Planning in Latin America (Chile)	-	4pg	
82-0120	Dissemination Biological Nitrogen Fixation Technology (Kenya)	-	4 post Ph. D.	
82-0157	Technological Capability in Oil Refining (Sierra Leone)	-	1 post Ph. D. & 1 pg	
82-0172	Space Science Infrastructure Review (Mexico)	-	-	
82-0182	Copper Policy (Peru)	-	-	
82-0197	Rural Technology Assessment (Chile)	-	4 pg	
82-0202	Technological Capacity and Nationalization (Ghana)	-	1 post Ph.D. & 2 pg	
82-0204	Pampa Agriculture: Technical Change and Policy (Argentina)	-	-	
82-0212	Agro-Industry: Technology Policy (Costa Rica) Ph. I	-	2 pg	
82-0224	Technical Changes in the Dairy Sector (Uruguay) Ph. II	-	3pg	
16 Projects		53	33	

1. As a stated objective of project or a formal course has been stipulated.
2. Acquiring new or upgrading existing techniques/knowledge as a result of participation in the research process.

VI. The Energy Policy Sub-Programme

The Energy Policy Sub-Programme (EP) has emerged as a special area of concern within the Science Technology and Energy Programme (STEP) with which it has remained operationally and organizationally integrated. The EP is concerned with developing and funding research related to the formulation, implementation and evaluation of energy policies in developing countries. The STEP has funded energy related projects as early as 1977. However, most of the energy projects to date have come on stream in the last three fiscal years.

There have been twelve (12) past or current energy policy research projects. They are listed in Annex I. Two projects (3-P-81-0187 - ERG) and (3-P-82-0114) stand out as being considerably larger than the remainder. ERG is of Centre-wide importance and will be discussed separately below. Urban food, fuel and shelter is more a project of the Urban Programme than the EP (the latter constributes only one third to the total budget) and has not become functional yet due to institutional difficulties.

The following themes are reflected in the remainder of the projects:

(a) Energy Surveys (Particularly in Rural Areas)

The majority of the projects (8 out of 10) involve energy surveys; of these, five are of rural areas. A recent project (3-P-81-0193) reviews the literature on rural energy survey methodologies which will enable EP, and IDRC in general, to better support and evaluate proposals for rural energy surveys.

(b) Evaluation of Technology (Technology Assessment)

Two projects (3-P-77-0076 and 3-P-80-0036) specifically deal with the technical, economic and social evaluation of technologies under actual

operating conditions involving methods such as cost-benefit analysis and environmental and social impact assessment. The first project assesses biogas technology; the second, an array of rural energy systems. Technology assessment serves to guide policy formulation regarding the choice of particular technologies in specific environments.

(c) Sector Studies

Most of the projects focus on the domestic sector with special regard to rural households. Two projects (3-P-80-0196 and 3-P-81-0051) look at the industrial sector. The first studies technical changes in selected industries as a result of changes in fuel price and availability. The second project analyzes energy industries (oil and gas, coal, power) with respect to technological and economic factors influencing the operation and expansion of these industries.

Two further projects (3-P-80-0111 and 3-P-80-0043) examine energy use in various economic sectors including agriculture, industry, households, transport, and commerce.

(d) Energy Planning

While most or all of the projects deal with subject matters that have to be considered elements in the process of energy planning, there are two projects that aim at improving energy planning methodologies (3-P-81-0042 and 3-P-82-0099). The first examines in detail the features of the energy system of a sub-region of a country, analyzes relationships between energy use and explanatory variables (income, family size and economic activity), and based on this information, prepares a medium term scenario of the energy supply situation. The second considers energy planning practices and methodologies at a macro level in a continental context.

Some additional features are noteworthy:

(i) general focus

There is a general focus on rural areas energy problem.

(ii) geographic distribution of projects

The majority of the projects have been or are being carried out in Asia. There are only two projects in Africa and Latin America each.

(iii) project size

Projects are generally small (aside from ERG and 3-P-82-0114). There is only one project whose budget is above $100,000. Average project budget size amounts to $57,000.

(iv) training

Several of the projects, notably 3-P-80-0196, 3-P-81-0042 and 3-P-82-0099, have training components which provide guided research opportunities for students.

(v) project related fellowships

One project (3-P-77-0076) has resulted in a post-project fellowship award.

An initiative of special significance is the creation of what is called the Energy Research Group (ERG). This is the first and most important project to be financed from the new IDRC energy grant.

While Andrew Barnett provided a large intellectual input into the development of ERG, this project is Centre-wide in importance and scope. It is administered by the President's Office; a steering committee under the direction of the President has been set up to oversee activities within the project. ERG will consist of a group of some ten eminent researchers and policy makers from developing countries who will meet over a three year period to review energy research requirements, priorities and resources in developing countries, and provide an independent source of information to assist developing countries and donor agencies in developing energy research strategies. The first meeting will take place in Ottawa in August 1983, and will be preceded by an "Energy Research Priorities" seminar where a number of leading researchers from developed as well as developing countries will present state of the art papers to serve as an input into ERG. ERG will be coordinated from an IDRC-based secretariat headed by Dr. Ashok Desai who will be based in Ottawa as of June 1983. In May 1983 the United Nations University (UNU) oficially joined IDRC in sponsoring this activity. The budget of the joint projects has increased by 50 percent to $1.2 million over three years. The UNU contribution will primarily help finance meetings and review studies for ERG. While ERG is an activity that is clearly separate from EP, it is hoped that the two entities will prove to be mutually beneficial.

EP is involved in another major Centre-wide energy initiative. It helped organize a meeting in April 1982 of major international funding agencies to exchange information and develop a more responsive approach to funding energy research. This meeting was co-chaired by Enrique Iglesias, Executive Secretary of the UN Commission for Latin America, and the President of IDRC. The agencies agreed that coordination was needed to avoid wasteful existing duplication of effort. There are plans for a second Donors' meeting later in 1983.

In addition to regular project activities, ERG and the Donors' meeting, EP has supported a number of meetings and consultancies. Support for meetings has served to facilitate attendence of Third World researchers or to identify and define projects. The

main objectives for commissioning consultancies have been to analyze and settle issues or to advise on methodology and project proposals in areas of interest to EP.

The meetings' themes have included the following:

- end-use focussed energy strategy;
- non-technical obstacles to the use of new energy resources; and,
- styles of development and energy demand.

The consultancies have been on topics including:

- energy in Bangladesh;
- civilian nuclear technology policy; and,
- energy and rural women's work.

T.3 List of Energy Projects Supported by STEP

Project Number	Title	Budget	Duration (Months)	Start	Duration
3-P-76-0186	Fiji Rural Energy	$28,000	12	May 31/77	Completed
3-P-77-0076	Bangladesh, Thailand, Philippines, Korea, Biogas Technology Socioeconomic Evaluation	$50,000	22-30	Feb. 1979	Evaluation
3-P-80-0036	Thailand, Renewable Energy Policy	$44,000	18	Jan. 12/81	Active
3-P-80-0111	Sierra Leone, Energy Use Patterns	$25,000	18	April 2/81	Active
3-P-80-0196	Thailand, Technological Responses to Rising Energy Prices	$63,800	36	July 28/81	Active
3-P-81-0042	Argentina, Regional Energy Systems	$62,000	12	Oct. 1/81	Active
3-P-81-0043	Fiji, Urban Energy Survey	$73,750	24	Sept. 1981	Active
3-P-81-0051	India, Technology and the Development of Energy Industries	$74,000	24	Mar. 19/82	Active
3-P-81-0187	Group on Energy Research Policy (ERG)	$800,000	36		Active
3-P-81-0193	Rural Energy Survey Methods	$ 32,500	10	May 13/82	Active
3-P-82-0099	Chile, Energy Planning Methodologies	$117,000	24	Dec. 24/82	Active
3-P-82-0114*	Kenya, Urban Food, Fuel and Shelter	$305,000*	24	Oct. 22382	Not yet functional

* Jointly with Urban Programme, two thirds of budget comes from Urban Programme.

VII. Evaluation

The STEP program now has been active for a period of eleven years; results are encouraging but I would stress that this is very much a surface view. STEP represents a broad and complex field of study. One must constantly ask if the STEP unit, with the small amount of human and financial resources at its disposal, is fulfilling a useful function in terms of the mandate of the Centre and the needs of its recipients. The unit's work must further be evaluated in light of the potential of the work and effort expended by researchers and policy-makers associated with this area and with respect to the long-term challenges faced by developing countries.

I have considerable doubts that a small staff can maintain an appropriate momentum under the current constraints of responsiveness, technical awareness and institutional knowledge without greater specialization and focus. This concern has prompted the program to request an evaluation which examines the value of the program and its results by consulting experts and recipients.

Two steps have been taken to assist this exercise:

(a) The creation of a project library consisting of all project reports currently available. The library was carefully and patiently organized by Vicky Berry.

(b) A review of PCR's commenced by program staff and to be supplemented by assistance from Andres Perez, the STEP summer student.

The need to review the program, through the mechanism of the PCR's and an evaluation, is now urgent.

There is additional further need to develop a proper balance between Science and Technology project administration on the one hand and Energy Policy on the

other. Although there is a need for another energy specialist, greater attention should be paid to energy research in the future in order to continue the development of this important field.

VIII Other Unit Activities

The Unit staff participates in a number of other Divisional and Centre activities which are complimentary to our current work but which uses staff time and resources. I should add that we regard the activities as valuable to our commitment to Centre and Divisional goals, but they can require considerable additional work.

The principle associated activities are:

(a) Energy Research Group

A project sheparded by the Unit and the Energy Policy Subprogram and which now has a full time director in Ottawa. A member of the Unit sits on the ERG Steering Committee, see page 26.

(b) Technology Policy Workshop

This independent program occupies, apart from the Co-ordinator, three project staff members including the Director, Assistant and Secretary.

(c) Special and Other Institutional Support

This program consists of the special institutional support program of E. Fox for which three grants were processed in FY 1982/83; the learned societies program where last year three grants were processed with co-operative funds; and two other grants for the IDS, Guyana and OSSRIA. These eight files are administered by program staff.

(d) Macro - Economic Policy Administration

For the period of ten months the senior program officer of the Economics program reported through this Unit to the Director at his request. This arrangement ended on March 31, 1983.

(e) Other Activities

These included pariticipation in the Women's group, the PROMIS Committee, the review of the Armstrong Bernard Report, and the IEC, as well as a number of Centre initiatives including IFIAS, etc.

IX Staff

The Science Technology Energy Program has six full time staff members, which is a considerable improvement on previous years. During 1981, the program was staffed by A. D. Tillett, J. A. Barnett (Sussex), and C. Smart who were joined in December 1981 by Dr. A. Rath. In August 1982, Dr. E. Rathgeber joined the program and in January 1983, Dr. H. Krugmann. The addition of these staff members has greatly enhanced the capacity of the program as well as improving the quality of the Unit's work. The Unit is fortunate to have them working in this area.

The program officers in this unit must understand the administrative, financial, operational and substantive aspects of all projects in the unit's portfolio. We assume that in order for a program officer to achieve this knowledge, he/she must undertake a period of training which will last for about one year. The training is informal, rather than formal, in that it is undertaken by co-operative work with other and more experienced program officers.

The program assumes equality between colleagues and almost all decisions are discussed between us. The program believes that many of the administrative functions - such as that of the Associate Director - could be rotated between members of staff in order to give a new sense of leadership and new perspectives on the decisions that an Associate Director has to take. Although the program officers try to work on themes and not on regions, this is proving to be difficult because only one program officer speaks Spanish. Indeed the most serious problem facing the unit at the moment, is the amount of work that has to be carried by the Spanish-speaking program officer. We are hoping to bring this problem to the attention of the Division again in the hope that we can increase our staff and therefore the quality of work in Spanish-speaking countries.

Unlike other programs, the majority of projects are identified and developed by Ottawa program staff. The apparent centralization of the program in

Ottawa is the result of two distinct pressures; first, the need to understand the field and the range of issues covered by science and technology policy which often requires collegiate discussion and debate in Ottawa; second, the change in Divisional appointments from generalists to specialists in the regional offices. In the past, program officers working in regional offices were considered as representatives; more recently, the Division has sought program officers with a particular specialization in order to upgrade Divisional work in the region with a particular institution or research centre. Whatever the value of this approach, it has led to the appointment of program officers unacquainted with science and technology policy and with the important task of responding to other programs, where their specialization meets a particular need. In a number of the regions therefore, the program has to rely on its own expertise.

The program has received considerable support from Steven Langdon, the Division's representative in Nairobi and we look forward to a continued association on his return to Ottawa. Elizabeth Fox (Buenos Aires) and Stuart Brown (WARO) spend approximately 25 percent of their time on Science and Technology Policy projects. In the last year, Stuart Brown's activities in the region have been important in contributing to the success of the Monrovia and Dakar Technology Policy Workshops. We would like to thank them for their contribution to the program.

Finally, the work of the unit could not proceed without the dedicated and efficient work of the support staff. They often have to bear the brunt of the work when the program officer is travelling and to answer questions from management on financial and administrative matters. In the unit, the secretarial staff have particular tasks including the filing systems (6), the program book, the typing of key documents and the introduction and organization of PROMIS. Without Julia Trudel, Doris Ngiam, and Hélène Charlebois the program could not function.

The Technology Policy Workshop also contributes to the work of the program. Although run separately, Jamieson Campbell and Anne Schwenk, who

took Hélène Charlebois' place in the project, support the morale of the unit as well as providing information and assistance.

X. Relations with other Divisional and Centre Activities

The Unit does not work alone but depends on the support and expertise of many in the Centre. The more formal associations, which the Unit regards as central to its task and continued development, include the following:

(a) Communications Subprogram

Since joining the Division from the Information Division, Elizabeth Fox has developed a number of projects on communications within the Education program. During FY 1982/83 a number of initiatives were commenced with the probability of their bearing fruit in FY 1983/84 on the subject of communications and technology. In FY 1982/83 the Unit supported the visit of Elizabeth Fox to Kenya and India.

(b) Educational and TEED

The Unit has good relations with other Divisional units. The most formal association is with the Education program and concerns the joint projects being funded under the title Technology, Education, Employment and Development (TEED). The program helped support two meetings during FY 1982/83 with the Education program.

There are a number of joint projects with the Economics program which we hope will be continued and expanded with the return of Steven Langdon to Ottawa.

(c) Other Divisions

The Unit, because it considers that both scientific and technological knowledge are essential to science and technology policy, welcomes and seeks assistance from the other more scientific Divisions.

STEP has also maintained close contact with the Office of Planning and Evaluation and a number of regional office initiatives in the field of resource allocation and science and technology activities. The results provided from these studies and initiatives are valuable to the program and the work of the unit's program officers.

In FY 1982/83 only one project - that on Computer Conferencing - is the outcome of activities with another Division and it is hoped that we can expand our associations with Information Sciences on the impact of new information technologies in the future. We try to maintain contacts with other Divisions but it is a weakness of the program that we do not have greater contact with more technical personnel.